

WHAT IS CLAIMED IS:

1. A back side incident type image pickup  
sensor having on the front side of a semiconductor  
substrate a photoelectric conversion portion and an  
5 electric circuit, and having on the back side of the  
semiconductor substrate an opening through which a  
radiation beam is incident, the incident radiation  
beam being detected by the photoelectric conversion  
portion formed on the front side of the semiconductor  
10 substrate, wherein the electric circuit is disposed  
at a given distance in the horizontal direction from  
the opening.

2. A back side incident type image pickup  
15 sensor according to claim 1, wherein the  
semiconductor substrate is a single crystal silicon  
substrate.

3. A back side incident type image pickup  
20 sensor according to claim 1, wherein the  
semiconductor substrate is reduced in thickness after  
a semiconductor integrated circuit that constitutes  
the photoelectric conversion portion is formed.

25 4. A back side incident type image pickup  
sensor according to claim 1, wherein the radiation  
beam is infrared light.

5. A back side incident type image pickup sensor according to claim 4, wherein the infrared light has a wavelength in a range of 975 to 1150 nm.

5           6. A back side incident type image pickup sensor according to claim 1, wherein the radiation beam is an X-ray.

7. A back side incident type image pickup  
10 sensor according to claim 1, wherein the photoelectric conversion portion is composed of a photodiode.

8. A back side incident type image pickup  
15 sensor according to claim 1, wherein the electric circuit serves as one of a driver circuit for driving the photoelectric conversion portion and a signal processing circuit for processing a signal from the photoelectric conversion portion.

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9. A back side incident type image pickup sensor according to claim 1, wherein the given distance is 0.303 times the thickness of the semiconductor substrate or more.

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10. A back side incident type image pickup sensor according to claim 1, wherein the given

distance is 50  $\mu\text{m}$  or more.

11. A back side incident type image pickup  
sensor according to claim 1, wherein a dummy pixel is  
5 formed in an offset portion between the electric  
circuit on the front side of the semiconductor  
substrate and the opening.

12. A back side incident type image pickup  
10 sensor according to claim 1, wherein a diffusion  
region for absorbing electric charges is formed in  
the offset portion between the electric circuit on  
the front side of the semiconductor substrate and the  
opening.

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